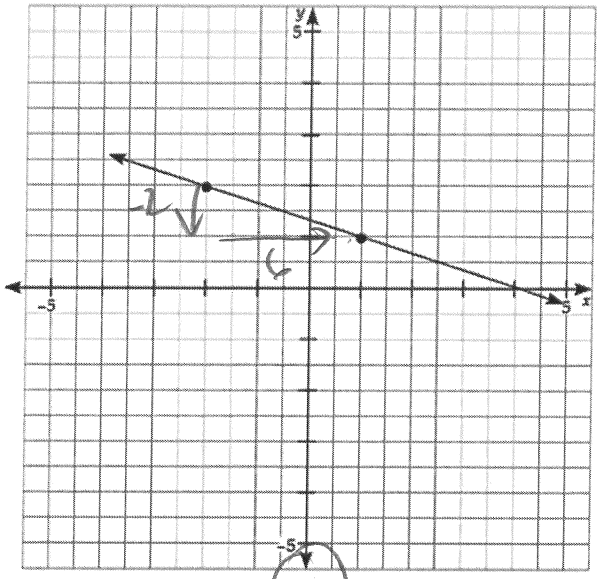
Final Exam Multiple Choice Practice

1. Calculate the slope of this line



$\frac{\text{rise}}{\text{run}} = \frac{-2}{6} = \frac{-1}{3}$

A) $\frac{1}{3}$ **B)** $\frac{3}{1}$ **C)** $-\frac{1}{3}$ **D)** $-\frac{3}{1}$

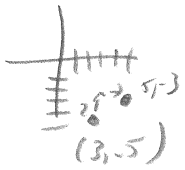
$y=0$ $x=0$ $x=5$ $y=3$

2. The x and y intercepts of the linear relation $3x + 5y - 15 = 0$ are

A) $(3,0)$ and $(0,5)$ **B)** $(5,0)$ and $(0,3)$ **C)** $(-3,0)$ and $(0,-5)$ **D)** $(0,0)$ and $(0,0)$

3. The graph of a linear function has a slope of 2 and goes through the point $(3,-5)$. Another point on the line is at

$\frac{\text{rise}}{\text{run}} = \frac{2}{1}$ ↑2 →1



A) $(3,-8)$ **B)** $(-11,0)$ **C)** $(5,-3)$ **D)** $(4,-3)$

4. The slope of a horizontal line is

A) 0 **B)** 1 **C)** -1 **D)** undefined

5. The equation of a line that is parallel to $y = 3x + 5$ is

$m=3$

A) $y = -3x + 15$ **B)** $y = -\frac{1}{3}x + 5$ **C)** $y = -3x + 5$ **D)** $y = 3x + 15$

6. Write $\sqrt[5]{x}$ with a rational exponent

$x^{\frac{1}{5}}$

A) $x^{\frac{5}{1}}$ **B)** x^{-1} **C)** $x^{\frac{1}{5}}$ **D)** $5^{\frac{1}{x}}$

7. Write $\sqrt{12}$ as a mixed radical $\sqrt{4 \cdot 3}$

A) $4\sqrt{3}$ **B)** $2\sqrt{3}$ **C)** $3\sqrt{2}$ **D)** $3\sqrt{4}$

8. Simplify $(3m^4n)(2m^5n)$

A) $5m^9n$ **B)** $6m^9n$ **C)** $6m^{20}n^2$ **D)** $6m^9n^2$

9. The least common multiple of 32 and 20 is

A) 160 **B)** 640 **C)** 320 **D)** 4

32 → 16 2 → 4 4 → 2 2 2 2 → 2^5

20 → 4 5 → 2 2 → $2^2 \cdot 5$ → $2^5 \cdot 5 =$

10. Which of the following is a perfect cube number?

A) 324 **B)** 343 7^3 **C)** 333 **D)** 361

11. Convert 147 m to inches $\times 3.28$ of 39895 $\times 12$

A) 186.37 in **B)** 3.73 in **C)** 14700 in **D)** 5787 in

12. A cube is 6 m long and 4 m wide and 80 m high. Calculate the volume of this cube. $V = LWH$ $6 \cdot 4 \cdot 80$

A) 1920 m^3 **B)** 19.2 m^3 **C)** 7077.888 m^3 **D)** 192 m^3

13. The volume of a sphere is 87 cm^3. Calculate the radius of the sphere $87 = \frac{4}{3}\pi r^3$

$\sqrt[3]{87 \div 4 \div \pi \times 3}$

A) 20.8 cm **B)** 2.7 cm **C)** 4.6 cm **D)** 5.9 cm

14. The volume of a cone is 30 m^3. What is the volume of a cylinder with the same base and height? ($\frac{1}{3}$ of cylinder; 3 cones)

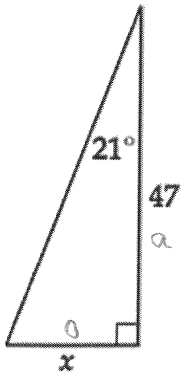
$V = \frac{1}{3}\pi r^2 h$ $V = \pi r^2 h$

A) 10 m^3 **B)** 30 m^3 **C)** 90 m^3 **D)** 900 m^3

15. The width of a child's pinky finger could be used as a referent for

A) 1 mm **B)** 1 m **C)** 1 inch **D)** 1 cm

16. Solve for x



$\tan\theta = \frac{o}{a}$

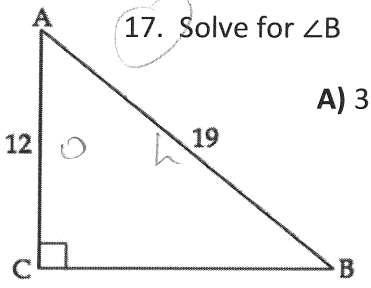
A) 122.4 **B)** 18.0 **C)** 19.1 **D)** 43.9

$\tan 21 = \frac{x}{47}$

$47 \tan 21 = x$

18.

17. Solve for ∠B



A) 32.3° **B)** 39.2° **C)** 50.8° **D)** 57.7°

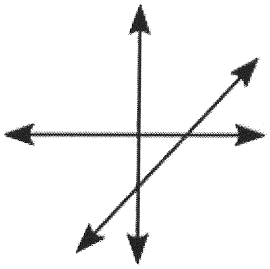
$\sin B = \frac{12}{19}$

$B = \sin^{-1}\frac{12}{19}$

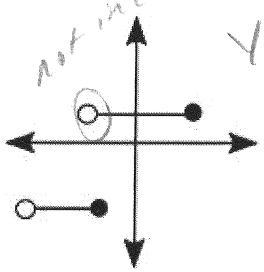
$B =$

18. Which of the following does not represent a function?

A)



B)



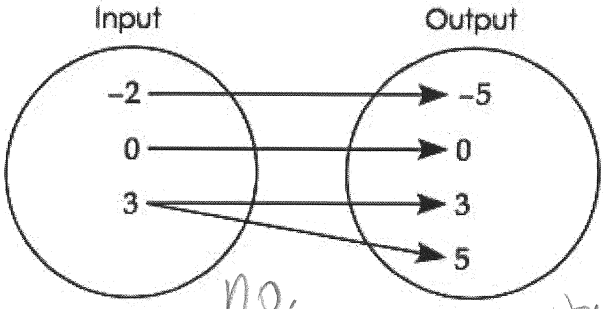
not included

yes.

C)

$\{(2, 2), (3, 2), (4, 2) (5, 2)\}$

D)



no, one input has 2 outputs

19. Given the function $f(x) = \frac{3}{2}x + 9$, find $f(4)$

A) $-\frac{10}{3}$ **B)** 10.5 **C)** 15.0 **D)** 3.75

$f(4) = \frac{3}{2}(4) + 9$

$= 6 + 9$

20. Multiply $4(2x + 3)$

A) $8x + 12$ **B)** $8x + 3$ **C)** $2x + 12$ **D)** $24x$

21. Multiply $(x+4)(x+9)$ $x^2+9x+4x+36$

A) x^2+13 **B)** $2x+13+36$ **C)** x^2+36 **D)** $x^2+13x+36$

22. Factor $8x+14$ $2($

A) $8(x+14)$ **B)** $2(4x+7)$ **C)** $4x(2\cdot 7)$ **D)** $8(x+6)$

23. Factor $x^2-4x-12$

A) $(x-6)(x+2)$ **B)** $(x+6)(x-2)$ **C)** $(x-6)(x-2)$ **D)** $(x+6)(x+2)$

24. Factor x^2-25

A) $(x-5)(x-5)$ **B)** $(x+5)(x+5)$ **C)** $(x-5)^2$ **D)** $(x+5)(x-5)$

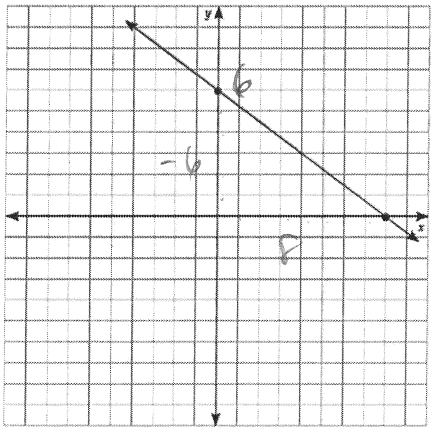
25. Calculate the distance between the two points $(13,5)$ and $(-17,-9)$ $\sqrt{(5+9)^2+(13+17)^2}$ $\sqrt{196+900}$

A) $\sqrt{1096}$ **B)** $\sqrt{32}$ **C)** $\sqrt{704}$ **D)** $\sqrt{128}$

26. Determine the coordinates of the midpoint of the line segment with endpoints at $(-15,9)$ and $(7,-11)$ $\left(\frac{-15+7}{2}, \frac{9-11}{2}\right)$ $\left(-\frac{8}{2}, -\frac{2}{2}\right)$

A) $(-11,10)$ **B)** $(11,-1)$ **C)** $(4,1)$ **D)** $(-4,-1)$

27. Write the equation of this line in slope intercept form



A) $y=\frac{3}{4}x+6$ **B)** $y=\frac{4}{3}x+8$

C) $y=-\frac{3}{4}x+6$ **D)** $y=-\frac{3}{4}x+8$

$m=\frac{rise}{run}=\frac{-6}{8}=-\frac{3}{4}$

28. Which ordered pair is the solution to the given linear system

① $x-5y=-15$

② $4x+10y=-30$

$\times 2$ ① $2x-10y=-30$

② $4x+10y=-30$

$6x=-60$

$x=-10$

A(-5,-1)
B(-5,2)
C(5,-5)
D(-10,1)
(-10,1)

① $-10-5y=-15$

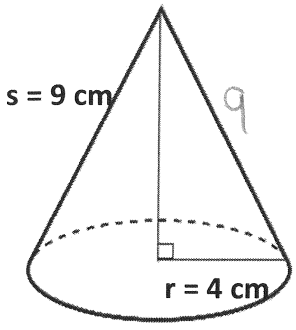
$-5y=-5$

$y=1$

Final Exam Review – Correct the Mistakes

The following questions contain the **wrong** answer/solution. It is your job to find and explain the mistakes and determine the correct solution to the given problems.

1. Here is a student's work for finding the volume of a right cone. Circle and explain the error(s). Determine the correct solution.



height:

$s^2 = h^2 + r^2$

$(9)^2 = h^2 + (2)^2$

$18 = h^2 + 4$

$18 - 4 = h^2$

$14 = h^2$

$\sqrt{14}\text{ cm} = h$

volume:

$V = \frac{1}{3}\pi r^2 h$

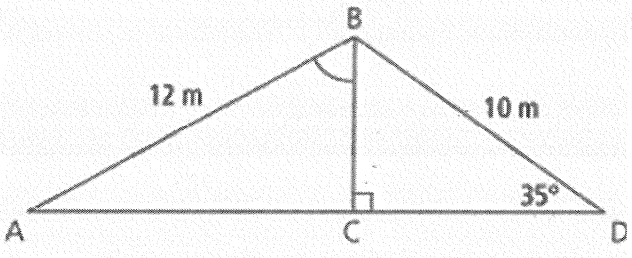
$V = \left(\frac{1}{3}\right)(\pi)(4^2)(\sqrt{14})$

$V = \left(\frac{1}{3}\right)(\pi)(16)(\sqrt{14})$

$V = 62.69\ cm^2$

The radius is the base of the triangle. We don't have to divide by 2. (Unlike pyramid). If we had diameter, we would ÷ 2 to find radius.

2. Here is a student's work for finding the measure of $\angle ABC$. Circle and explain the error(s). Determine the correct solution.



BC:

$\sin\theta = \frac{\text{opp}}{\text{hyp}}$

$\sin 35° = \frac{BC}{10}$

$10\ \frac{\sin 35°}{10} = BC$

$0.057\ldots\text{ m} = BC$

5.7357

Cross multiply. sin 35 multiplied by 10. $10\sin 35$

$\angle ABC$

$\cos B = \frac{\text{adj}}{\text{hyp}}$

$\cos B = \frac{0.057\ldots}{12}$

$\angle B = \cos^{-1}\left(\frac{0.057\ldots}{12}\right)$ → 61.45°

$\angle B = 89.97°$

$\angle ABC = \frac{89.97°}{2}$

$\angle ABC = 44.99°$

not needed. we already found $\angle ABC$.

3. Here is a student's work for simplifying the given radical. Circle and explain the error(s). Determine the correct solution.

$\sqrt{60} = \sqrt{36 + 24}$ have to multiply, not add.

$= \sqrt{36} + \sqrt{24}$ does not equal above.

$= (6)\sqrt{(4)(6)}$ does not equal above.

$= (6)(4)\sqrt{6}$

$= (24)\sqrt{6}$

$\sqrt{60} = \sqrt{4 \cdot 15}$

$= \sqrt{4} \cdot \sqrt{15}$

$= 2\sqrt{15}$

60 → 6 10 → 1 1 → 2 3 5

4. Here is a student's work for expanding and simplifying the following binomials. Circle and explain the error(s). Determine the correct solution.

$$(2x-3)(x-1)-(x+3)(3x-4)$$
$$=2x^2-2x-3x-3-(3x^2-4x+9x-12)$$
$$=2x^2-5x+3-3x^2-4x+9x-12$$
$$=-2x^2-9$$

$(-3)(-1) = 3$ not -3

should simplify in bracket before distributing negative

didn't distribute the negative

Should be:

$-2x^2-2x-3x+3-(3x^2+5x-12)$

$=2x^2-5x+3-3x^2-5x+12$

$=-x^2-10x+15$

5. Here is a student's work for simplifying an expression. Circle and explain the error(s). Determine the correct solution.

$$\left(\frac{-5a^2}{\frac{1}{b^2}}\right)^{-2}=\frac{10a^{-4}}{b^{-1}}$$
$$=\frac{b^1}{10a^4}$$

$(-5)^{-2} \neq 10$; $-5^{-2}=\left(\frac{-1}{5}\right)^2$

Should be: $\frac{(-5)^{-2}a^{-4}}{b^{-\frac{1}{2}}} = \left(\frac{-1}{5}\right)^2\frac{a^{-4}}{b^{-1}}$

$=\frac{1b}{25a^4}$

6. Here is a student's work for simplifying an expression. Circle and explain the error(s). Determine the correct solution.

$$\frac{(m^{-3}n^2)^{-4}}{(m^2n^{-3})^2}=(m^{-5}n^5)^{-6}$$
$$=m^{-11}n^{-1}$$

need to simplify each bracket before dividing num. by denominator.

$\frac{m^{12}n^{-8}}{m^4n^{-6}} = m^8n^{-8-(-6)} = m^8n^{-8+6} = m^8n^{-2}$

$=\frac{m^8}{n^2}$

7. Here is a student's work for the following question. Circle and explain the error(s). Determine the correct solution.

"Determine the equation of the line in **general form** that is perpendicular to the line that passes through the points $A(-3,1)$ and $B(5,2)$."

(next page)

#7 Errors A(−3,1) B(5,2) equation of line in general form.

Slope: $5-(-3)$

$$m = \frac{5-3}{2-1} = \frac{2}{1}$$

$$m\perp = \frac{1}{2}$$

Using point A(−3, 1)

$$y - y_1 = m(x - x_1)$$
$$y - 1 = \frac{1}{2}(x - 3)$$
$$(2)(y-1) = (2)\left[\frac{1}{2}(x-3)\right]$$
$$2y - 1 = 1(x-3)$$
$$2y - 1 = x - 3$$
$$-x + 2y + 2 = 0$$

$-(-3) = +3$

$y - 1 = -8(x+3)$

$y - 1 = -8x - 24$

$8x + y + 23 = 0$

↑ can't start general form with negative.

slope formula

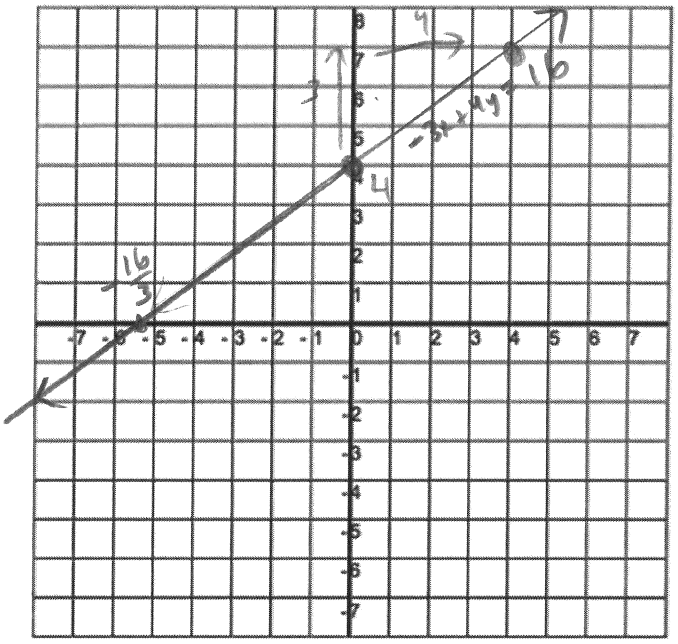
$$\frac{y_2 - y_1}{x_2 - x_1}$$
$$= \frac{1-2}{-3-5}$$
$$= \frac{-1}{-8}$$
$$= \frac{1}{8}$$

$m\perp = -8$

Final Exam Review – Graphing

1. Graph the following linear functions. On every graph, label your line and label both the x and y intercepts as coordinate points.

a) $-3x + 4y = 16$



Using intercepts:

x-intercept ($y = 0$)

$-3x + 4(0) = 16$

$x = \frac{-16}{3}$

$(-\frac{16}{3}, 0)$

y-intercept ($x = 0$)

$-3(0) + 4y = 16$

$y = 4$ $(0, 4)$

using slope-intercept $y = 3x + b$

$4y = 3x + 16$

$y = \frac{3}{4}x + 4$

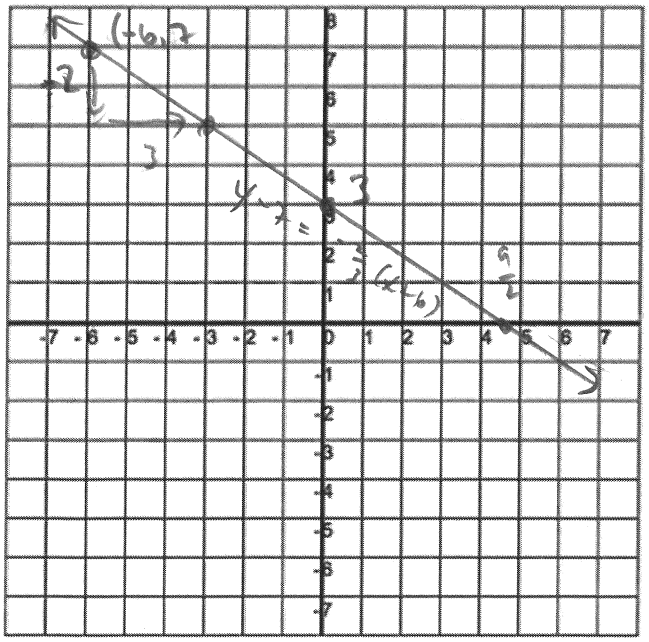
rise / run

b) $y - 7 = -\frac{2}{3}(x + 6)$

$m = \frac{-2}{3}$ point $(-6, 7)$

rise -2 ↓

run $\rightarrow 3$



$x = 0$

$y - 7 = -\frac{2}{3}(0 + 6)$

$y - 7 = -\frac{2}{3}(6)^2$

$y - 7 = -4$

$y = 3$

$y = 0$

$0 - 7 = -\frac{2}{3}(x + 6)$

$3(-7) = 3(-\frac{2}{3}(x + 6))$

$-21 = -2x - 12$

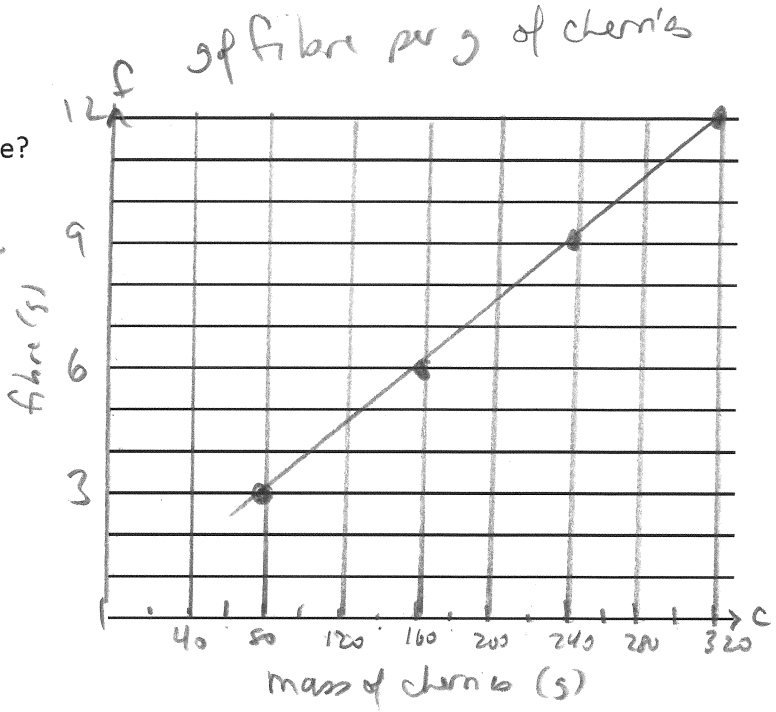
$-9 = -2x$

$\frac{9}{2} = x$

2. Fresh cherries are a treat during the summer months! The following table represents the amount of fibre from various quantities of cherries.

Mass of Cherries (g)	Amount of Fibre (g)
80	3
160	6
240	9
320	12

a) Graph the following data. Choose an appropriate scale. Label each axis and give your graph a title.



b) Will you connect the points with a line? Justify your answer.

Yes. There are masses of cherries in between given values

c) Calculate the rate of change. Explain its meaning.

$\frac{\text{change in } y}{\text{change in } x} = \frac{6-3}{160-80} = \frac{3}{80} = 0.0375$

0.0375 g fibre/g cherries

3. Solve each of the following linear system by graphing. Verify your solutions.

a) ① $\frac{1}{2}y = x + \frac{3}{2}$ $y = 2x + 3$

② $\frac{1}{5}y + \frac{4}{5}x = -\frac{3}{5}$ $y = -4x - 3$

(-1, 1)

$\frac{1}{2}(1) - 1 + \frac{3}{2}$

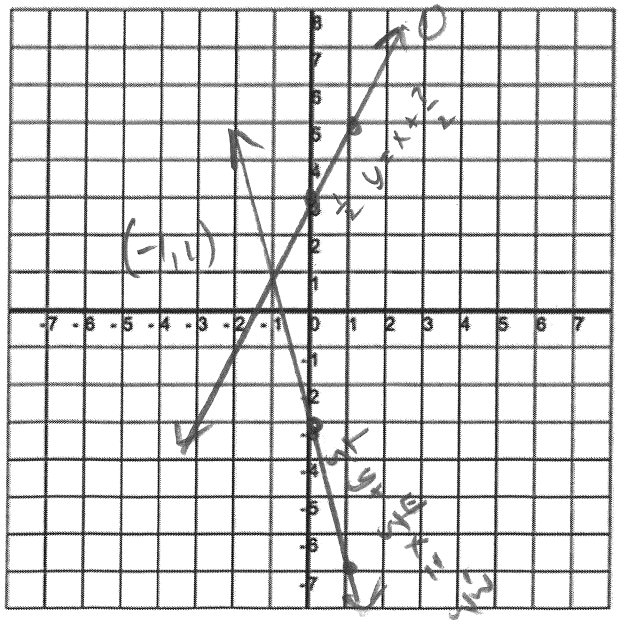
$-\frac{2}{2} + \frac{3}{2}$

$\frac{1}{2}$ ✓

$\frac{1}{5}(1) + \frac{4}{5}(-1) - \frac{3}{5}$

$\frac{1}{5} - \frac{4}{5}$

$-\frac{3}{5}$ ✓



b) $2x - y = 6$

$x + 3y = 10$

$y = 2x - 6$

$y = -\frac{1}{3}x + \frac{10}{3}$

or

$x = 10$

$y = \frac{10}{3} = 3\frac{1}{3}$

x	y
1	3
4	2

(4, 2)

$2(4) - 2$ 6

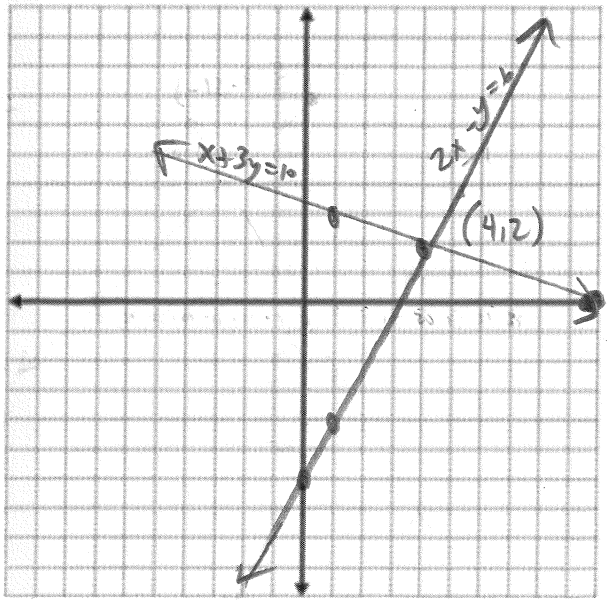
$= 8 - 2$

$= 6$ ✓

$4 + 3(2)$ 10

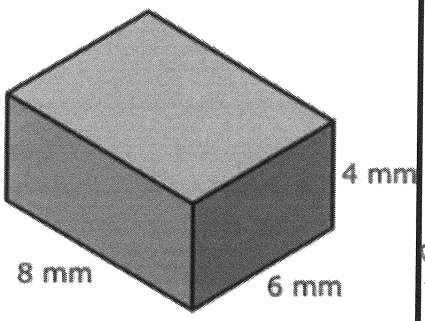
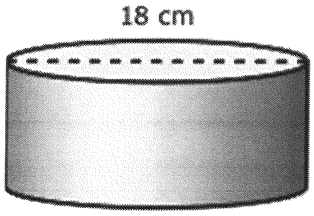
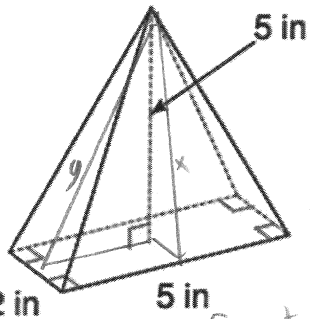
$= 4 + 6$

$= 10$ ✓



Final Exam Review – Surface Area and Volume

A. Determine the **surface area** and the **volume** of the following objects. Round your final answer to 2 decimal places. (if needed).

	SURFACE AREA	**VOLUME**
1. Rectangular Prism 	$2(lw + wh + lh)$ $= 2(8 \cdot 6 + 6 \cdot 4 + 4 \cdot 8)$ $= 2(48 + 24 + 32)$ $= 2(104)$ $SA = 208\ mm^2$	$V = lwh$ $= 8 \cdot 6 \cdot 4$ $V = 192\ mm^3$
2. Cylinder $r = 18$ 	$SA = 2\pi r^2 + 2\pi rh$ $= 2\pi (9)^2 + 2\pi (9)(10)$ $= 162\pi + 180\pi$ $= 342\pi$ $SA = 1074.42\ cm^2$	$V = \pi r^2 h$ $= \pi (9)^2 (10)$ $= 810\pi$ $V = 2544.69\ cm^3$
3. Rectangular Pyramid 	$SA = 2\Delta + 2\Delta + rect$ $= 2\left(\frac{5 \cdot \sqrt{26}}{2}\right) + 2\left(\frac{2\sqrt{11.25}}{2}\right) + 5 \cdot 2$ $= 5.0990 + 6.7082 + 10$ $SA = 21.81\ in^2$ (SA pyramid formula only for regular pyramids)	$V = \frac{1}{3} lwh$ $= \frac{1}{3}(5)(2)(5)$ $V = 66.67\ in^3$

slant height front

$5^2 + \left(\frac{2}{2}\right)^2 = x^2$

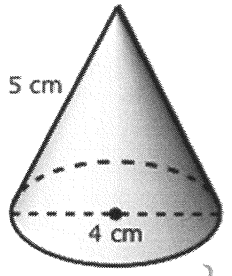
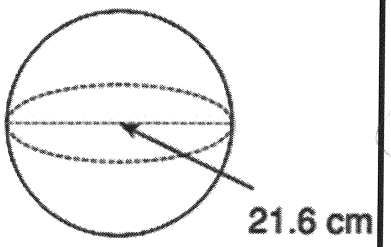
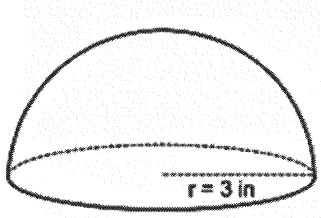
$5^2 + 1^2 = x^2$

$\sqrt{26} = x$

slant height side

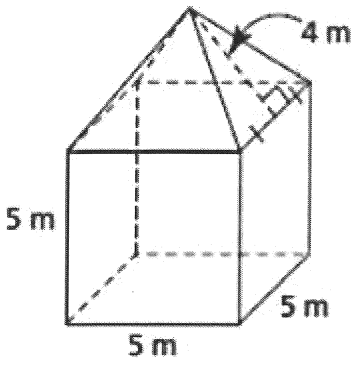
$5^2 + \left(\frac{5}{2}\right)^2 = y^2$

$\sqrt{11.25} = y$

	SURFACE AREA	VOLUME
4. Right Cone  $r = 2$	$SA = \pi r^2 + \pi r s$ $= \pi(2)^2 + \pi(2)(5)$ $= 4\pi + 10\pi$ $= 14\pi$ $SA = 43.98\ cm^2$	$V = \frac{1}{3}\pi r^2 h$ $= \frac{1}{3}\pi(2)^2(5)$ $V = 20.94\ cm^3$
5. Sphere 	$A = 4\pi r^2$ $= 4\pi(21.6)^2$ $A = 5862.97\ cm^2$	$V = \frac{4}{3}\pi r^3$ $= \frac{4}{3}\pi(21.6)^3$ $V = 42213.35\ cm^3$
6. Hemisphere 	$A = 3\pi r^2$ $= 3\pi(3)^2$ $= 27\pi$ $A = 84.82\ in^2$	$V = \frac{2}{3}\pi r^3$ $= \frac{2}{3}\pi(3)^3$ $= 18\pi$ $V = 56.55\ in^3$

B. Determine the **surface area** of the following composite objects.

a)



SA prism without top:

5 squares

$5 \cdot 5^2$

$= 5(5)^2$

$= 125 m$

SA pyramid without base:

4 triangles

$4\left(\frac{1}{2}bh\right)$

$= 2(5)4)$

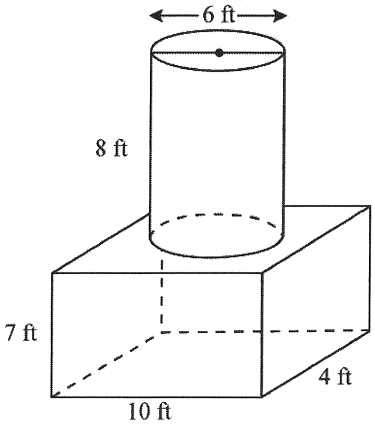
$= 40$

Object $= 125 + 40$

$= 165 m^2$

---

b)



SA cylinder w/o base

$\pi r^2 + 2\pi rh$

$\pi(3)^2 + 2\pi(3)(8)$

$= 9\pi + 48\pi$

$= 57\pi$

prism subtract circle

$2(LW + WH + LH) - \pi r^2$

$2(10 \cdot 4 + 4 \cdot 7 + 7 \cdot 10) - \pi(3)^2$

$2(40 + 28 + 70) - 9\pi$

$2(138) - 9\pi$

$276 - 9\pi$

object

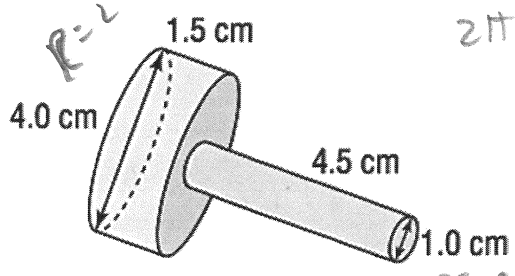
$57\pi + 276 - 9\pi$

$= 27\pi + 276$

$= 348.26 ft^2$

---

c)



SA base cylinder subtract both circles

$2\pi r^2 + 2\pi rh - \pi r^2$

$2\pi(2)^2 + 2\pi(2)(1.5) - \pi(0.5)^2$

$8\pi + 6\pi - 0.25\pi$

13.75π

SA top cylinder without top

$\pi r^2 + 2\pi rh$

$= \pi(0.5)^2 + 2\pi(0.5)(4.5)$

$= 0.25\pi + 4.5\pi$

$= 4.75\pi$

object

$13.75\pi + 4.75\pi$

$= 18.5\pi$

$= 58.12 cm^2$

IN CLASS FINAL EXAM REVIEW

If rounding needed, round to 1 decimal place

1. Convert 18 000 ft to miles yards and feet

2. Find the measure of $\angle A$ in a right triangle where a=12, b=13.9 and c=7. Round to 1 decimal place.

3. A TV antennae stands tall on top of the roof of a house. From 25 ft from the base of the house, the angle of inclination to the top of the house is 50° while the angle of inclination to the top of the antennae is 54.3°. Calculate the height of the antennae to the nearest foot.

4. Triangle ABC has the coordinates A(0,5) , B(2,-1) and C(8,1).
   a) Calculate the length of each side as a mixed radical (if possible)
   b) Calculate the midpoint of each side
   c) Calculate the slope of each side

5. Solve the following system of equations by substitution.

$$4x + 4y = 24$$
$$-9x + 3y = 6$$

6. Two small pitchers and one large pitcher can hold 8 cups of water. One large pitcher minus one small pitcher constitutes 2 cups of water. How many cups of water can each pitcher hold? Solve using elimination.

7. The sum of two numbers is 90. The larger number is 14 more than 3 times the smaller number. Find the numbers.

8. Find the slope-intercept form of the line passing through the points (3,-2) and (-4,6).

9. Find the general form of the line with slope of -5/3 and passes through the point (3,6)

10. Find the x and y intercepts of the line $5x + 12y - 30 = 0$. State your answers as coordinates.

11. Find the general form of the line perpendicular to $6x - 3y + 6 = 0$ that passes through the point (-9,4).

12. Factor
   a) $x^2 - 2x - 15$ $(x-5)(x+3)$
   b) $6x^2 + 4x - 42$ $2(3x-7)(x+3)$
   c) $6x^2 - 11x - 10$ $(3x+2)(2x-5)$
   d) $12m^2 + 23mn + 10n^2$ $(4m+5n)(3m+2n)$
   e) $27x^3 + 6x^2 - 81x$ $3x(9x^2+2x-27)$ (doesn't factor further)
   f) $49x^2 - 81$ $(7x-9)(7x+9)$

13. Simplify (Positive exponents only)

a) $\dfrac{48x^{12}y^{-7}}{-16x^{-4}y^{10}}$

$= -3x^{12-(-4)}y^{-7-10}$

$= -3x^{12+4}y^{-17}$

$= -3x^{16}y^{-17}$

$= \dfrac{-3x^{16}}{y^{17}}$

In class Final Exam review p. 17

① $\frac{18000\text{ ft}}{5280\text{ ft}} \mid \frac{1\text{ mi}}{}$ $18000 \div 5280 = 3.409$ → 3 miles

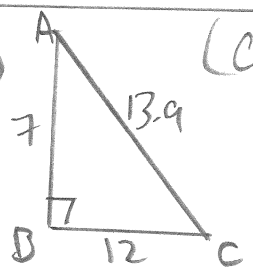
$3 \times 5280 = 15840$

$18000 - 15840 = 2160$

$2160\text{ ft} \div 3 = 720\text{ yds}$

3 miles 720 yd 0 feet

---

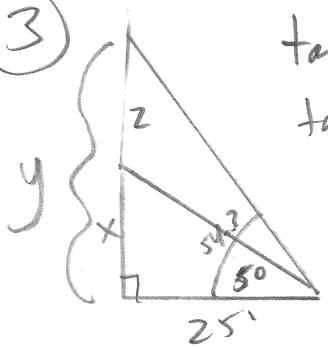
② 

(can use any ratio)

$\sin A = \frac{12}{13.9}$ or $\cos A = \frac{7}{13.9}$ or $\tan A = \frac{12}{7}$

$A = 59.7°$

---

③ 

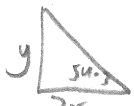
$\tan\theta = \frac{o}{a}$

$\tan 50 = \frac{x}{25}$

$25 \tan 50 = x$

$29.7938 = x$

$\tan 54.3 = \frac{y}{25}$



$25 \tan 54.3 = y$

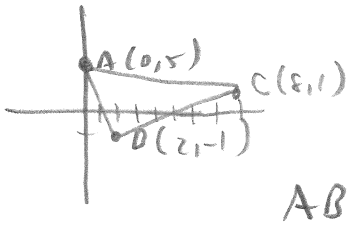
$34.7911 = y$

height $z = y - x$

$= 34.7911 - 29.7938$

height of antennae 5.0 ft

---

④ 

$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$ midpt: $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$m = \frac{y_2-y_1}{x_2-x_1}$

AB

$\sqrt{(0-2)^2+(5+1)^2}$

$= \sqrt{40}$

$= 2\sqrt{10}$

$\left(\frac{0+2}{2}, \frac{5-1}{2}\right)$

$(1, 2)$

$\frac{-1-5}{2-0}$

$= \frac{-6}{2}$

$= -3$

BC

$\sqrt{(2-8)^2+(-1-1)^2}$

$= \sqrt{40}$

$= 2\sqrt{10}$

$\left(\frac{2+8}{2}, \frac{-1+1}{2}\right)$

$(5, 0)$

$\frac{-1-1}{2-8}$

$= \frac{-2}{-6}$

$= \frac{1}{3}$

AC

$\sqrt{(0-8)^2+(5-1)^2}$

$= \sqrt{80}$

$= 4\sqrt{5}$

$\left(\frac{0+8}{2}, \frac{5+1}{2}\right)$

$(4, 3)$

$\frac{5-1}{0-8}$

$= \frac{4}{-8}$

$= -\frac{1}{2}$

(5) ① $4x+4y=24$
② $-9x+3y=6$

① $4x=-4y+24$
$x=-y+6$

② $-9(-y+6)+3y=6$
$9y-54+3y=6$
$12y=60$
$y=5$

① $4x+4(5)=24$
$4x=4$
$x=1$

$(1,5)$

(6) let m = small pitcher capacity (cups)
L = large pitcher capacity (cups)

① $2m+L=8$
② $L-m=2$

① $2m+L=8$
$\times 2$ ② $-2m+2L=4$
$3L=12$
$L=4$

② $4-m=2$
$2=m$

The small can holds 2 cups and the large can hold 4 cups.

$2(2)+4$
$4+4$ ✓ 8

$4-2$ ✓ 2
2

(7) Let x = one number
y = the larger number

① $x+y=90$
② $y=14+3x$

① $x+14+3x=90$
$4x=76$
$x=19$

① $19+y=90$
$y=71$

$19+71=90$
$3(19)+14=71$ ✓

The numbers are 19 and 71.

(8) $m=\frac{y_2-y_1}{x_2-x_1}$

$m=\frac{6+2}{-4-5}=\frac{8}{-9}$

$y+2=-\frac{8}{9}(x-3)$
$9y+18=-8x+24$
$9y=-8x+6$
$y=-\frac{8}{9}x+\frac{6}{9}$

(9) $y-6=-\frac{5}{3}(x+3)$
$3y-18=-5x-15$
$5x+3y-3=0$

(10) $x-int\ (y=0)$
$5x+12(0)-30=0$
$5x=30$
$x=6$ $(6,0)$

$y-int\ (x=0)$
$5(0)+12y-30=0$
$12y=30$
$y=\frac{30}{12}=\frac{5}{2}$ $(0,\frac{5}{2})$

(11) $6x-3y+6=0$
$-3y=-6x-6$
$y=2x+2$

$m_1=2$
$m_2=-\frac{1}{2}$

$y-4=-\frac{1}{2}(x+9)$
$-2y+8=x+9$
$x+2y+1=0$

12 a) $(x-5)(x+3)$
b) $2(3x^2+2x-21)$
$2(3x-7)(x+3)$
c) $(3x+2\sqrt{2})(2x-5)$
d) $(4m+5n)(3m+2n)$
e) $3x(9x^2+2x-27)$ doesn't factor further
f) $(7x-9)(7x+9)$

17B
+ Inclusive review

b) $\left(\frac{64x^{12}y^{-15}}{27}\right)^{\frac{-2}{3}}$ $= \frac{64^{-\frac{2}{3}} \times y^{10}}{27^{-\frac{2}{3}}} = \frac{27^{\frac{2}{3}} y^{10}}{64^{\frac{2}{3}} x^8} = \frac{(\sqrt[3]{27})^2 y^{10}}{(\sqrt[3]{64})^2 x^8} = \frac{9y^{10}}{16x^8}$

14. Find the LCM and GCF for each
    a) 35 and 40
    b) 27, 45, and 81

a) $35 = 5 \cdot 7$, $40 = 5 \cdot 8 = 5 \cdot 2^3$, LCM $= 5 \cdot 2^3 \cdot 7 = 280$, GCF $= 5$

b) $27 = 3^3$, $45 = 3^2 \cdot 5$, $81 = 3^4$, LCM $= 3^4 \cdot 5 = 405$, GCF $= 3 \times 3 = 9$

15. Reduce the following to mixed radicals in their simplest form
    a) $\sqrt{441} = 21$
    b) $\sqrt{648}$
    c) $\sqrt[3]{2187}$
    d) $\sqrt{256} = 16$

b) $648 = 4 \cdot 162 = 4 \cdot 2 \cdot 81$, $\sqrt{648} = \sqrt{324 \cdot 2} = 18\sqrt{2}$

c) $2187 = 9 \cdot 243 = 9 \cdot 9 \cdot 27 = 9 \cdot 9 \cdot 9 \cdot 3$, $\sqrt[3]{729 \cdot 9} = 9\sqrt[3]{9}$

16. Expand and Simplify
    a) $5(4x-3)^2 + (x+2)^2$
    b) $4(x-2)(x+2) - (3x-4)(2x+1)$

16a) $5(16x^2 - 24x + 9) + x^2 + 4x + 4$
$= 80x^2 - 120x + 45 + x^2 + 4x + 4$
$= 81x^2 - 116x + 49$

b) $4(x^2 - 4) - (6x^2 - 5x - 4)$
$= 4x^2 - 16 - 6x^2 + 5x + 4$
$= -2x^2 + 5x - 12$

17. Find the surface area of a sphere whose volume is 210.5 cm^3

17) $210.5 = \frac{4}{3}\pi r^3$
$r = 3.6902$
$SA = 4\pi r^2$
$= 4\pi (3.6902)^2$
$SA = 171.1 \text{ cm}^2$

18. Calculate the surface area of a cylindrical metal pipe with volume=432 cm^3 and diameter of 8 cm.

$r = 4$

18) $V = \pi r^2 h$
$432 = 4\pi (4)^2 h$
$2.1485 = h$

$SA = 2\pi r^2 + 2\pi rh$
$= 2\pi (4)^2 + 2\pi (4)(2.1485)$
$= 32\pi + 8\pi (2.1485)$
$= 100.5309 + 53.9976$
$= 154.5 \text{ cm}^2$